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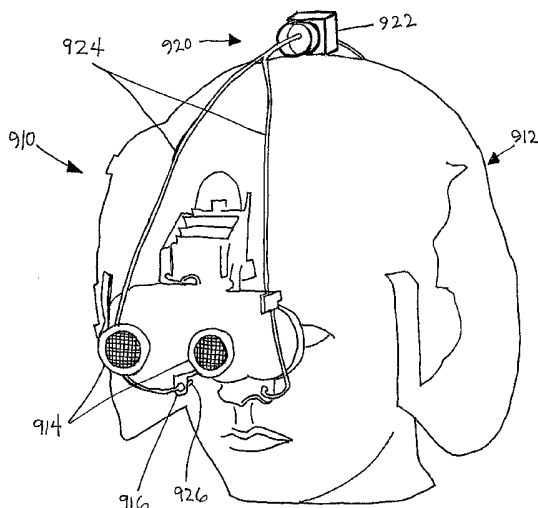
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: BIOSENSORS, COMMUNICATORS, AND CONTROLLERS MONITORING EYE MOVEMENT AND METHODS FOR USING THEM



(57) Abstract: Biosensor, communicator, and/or controller apparatus, systems, and methods are provided for monitoring movement of a person's eye. The apparatus includes a device configured to be worn on a user's head, a light source for directing light towards one or both eyes of the user, one or more image guides on the device for viewing one or both eyes of the user, and one or more cameras carried on the device and coupled to the image guides for acquiring images of the eyes and/or the user's surroundings. The apparatus may include a cable and/or a transmitter for transmitting image data from the camera to a remote location, e.g., to processor and/or display for analyzing and/or displaying the image data. A system including the apparatus may be used to monitor one or more oculometric parameters, e.g., pupillary response, and/or to control a computer using the user's eyes instead of a mouse.

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**INTERNATIONAL SEARCH REPORT**

International application No  
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**A. CLASSIFICATION OF SUBJECT MATTER**

A61B3/113    G02B27/00    G06F3/00    G06K9/00    A61B3/11

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

A61B    G02B    G06F    G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2001/028309 A1 (TORCH WILLIAM C) 11 October 2001 (2001-10-11) paragraph '0112!; figure 13 paragraph '0119!; claim 24	1, 14, 19
X		31
Y		24-28
Y	paragraph '0020!	38
A	US 4 815 839 A (WALDORF ET AL) 28 March 1989 (1989-03-28) claim 1; figure 1	1
X	US 6 003 991 A (VIIRRE ET AL) 21 December 1999 (1999-12-21) column 5, lines 5-13; figure 4	21
Y		22, 23, 29, 30
Y		24-28
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Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

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## INTERNATIONAL SEARCH REPORT

 International application No  
 PCT/US2005/011104

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 214 456 A (GERSTEN ET AL) 25 May 1993 (1993-05-25) column 4, lines 38-50; claim 5; figure 4	21
A	US 6 260 968 B1 (STARK LAWRENCE W ET AL) 17 July 2001 (2001-07-17) claim 26; figure 1	21
Y	US 4 850 691 A (GARDNER ET AL) 25 July 1989 (1989-07-25) figures 1a,1	22,23, 29,30
X	US 5 481 622 A (GERHARDT ET AL) 2 January 1996 (1996-01-02) column 5, lines 39-45; figures 1,2 column 9, lines 8-30; claims 1,3,4	33-35, 37,40
Y		38
X	column 18, lines 33-48	39,41
X	HEWLETT-PACKARD GMBH: "Helmet-mounted display for data recall and direct consultation during surgical operation (Hewlett-Packard GmbH)" January 1996 (1996-01), RESEARCH DISCLOSURE, MASON PUBLICATIONS, HAMPSHIRE, GB, XP007120804 ISSN: 0374-4353 the whole document	33-35, 37,40,42
X	EP 0 679 984 A (CANON KABUSHIKI KAISHA) 2 November 1995 (1995-11-02) column 13, lines 46-58 - column 14, lines 48-58; claims 1,5; figures 2,12	33-35, 37,40
X	EP 0 984 347 A (SEL SEMICONDUCTOR ENERGY LABORATORY CO., LTD) 8 March 2000 (2000-03-08) column 7, lines 30-35; claims 9,12; figures 1,13	33-37,40

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2005/011104

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:  
  
1-31, 33-42
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-20

Apparatus for monitoring the eyes of a person comprising two optical fiber bundles connecting each acquiring an image of an eye and transmitting it to a single image converter (CCD or CMOS)

1.1. claim: 31

Method of monitoring movement of a person's eye comprising the step of generating a graphical output of the movement  
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2. claims: 21-30

System for identifying a pupil of the eye  
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3. claim: 32

Method of monitoring the time to return to relaxed state after light pulsing inducing dilatation of the pupil.  
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4. claims: 33-42

System and method to control a cursor using eye tracking  
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No  
PCT/US2005/011104

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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